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# Fish Tank Granuloma

Fish tank granuloma, caused by the bacterium *Mycobacterium marinum*, is a rare but important skin infection primarily associated with exposure to contaminated aquatic environments. A member of the non-tuberculosis mycobacteria group, *M. marinum* is commonly found in stagnant freshwater and saltwater environments, including lakes, aquariums, inadequately chlorinated swimming pools, and oceans. The infection is especially prevalent in individuals who handle aquatic animals, such as aquarium owners, pet shop workers, and sushi chefs, or those involved in activities like shucking oysters.

**Etiology and Transmission**

*M. marinum* thrives in aquatic environments, particularly in temperatures around 30°C, which explains why the infection tends to occur on cooler skin surfaces, such as the hands and lower extremities. The infection is introduced through breaks or abrasions in the skin when an individual comes into contact with contaminated water. This direct inoculation is often associated with trauma, such as cleaning aquariums, handling fish, or injury from fish hooks. Importantly, fish tank granuloma is not transmissible person-to-person, but is instead acquired through environmental exposure to *M. marinum*.

**Clinical Presentation**

The hallmark of fish tank granuloma is the development of a slow-growing, red nodule or plaque at the site of inoculation, usually appearing two to four weeks post-exposure. The infection is most commonly found on the dorsum of the hands, though it may also affect the fingers, elbows, and, more rarely, the legs. In some cases, the infection exhibits sporotrichoid spread, a lymphatic spread pattern in which the infection moves along the lymphatic vessels. Although the initial lesion may be painful, it can become ulcerated, crusted, or necrotic as it progresses.

Long-standing, untreated infections have the potential to become more invasive, leading to involvement of deeper tissues, including joints, tendons, and bones. Immunocompromised individuals, particularly those on immunosuppressive therapy like prednisone, may be at an increased risk of systemic dissemination.

**Diagnosis**

Diagnosing fish tank granuloma can be challenging due to its nonspecific presentation, which overlaps with a variety of other dermatologic conditions, such as cellulitis, foreign body reactions, fungal infections, or skin cancer. Therefore, a high index of suspicion is necessary, particularly in patients with a relevant history of aquatic exposure.

A thorough patient history is critical in identifying potential sources of infection. If the clinical presentation suggests a mycobacterial infection, a skin biopsy may be performed. This is followed by culture of the specimen on Lowenstein-Jensen medium or Middlebrook agar, along with specialized molecular testing such as PCR for species-specific identification. Histopathological examination of the biopsy sample may reveal granulomatous inflammation, a characteristic feature of mycobacterial infections.

**Treatment**

The treatment of fish tank granuloma is primarily antibiotic-based, with various therapeutic regimens used depending on the severity and chronicity of the infection.

- ***Antibiotic Therapy:*** The first-line treatment typically involves a prolonged course of oral antibiotics, with common options including minocycline, doxycycline, clarithromycin, and trimethoprim-sulfamethoxazole. These agents are effective for treating superficial infections caused by *M. marinum*. However, due to the organism's ability to develop multi-drug resistance, dual antibiotic therapy may be required. Regimens such as rifampin combined with ethambutol are often used for more persistent or severe cases.
- ***Treatment Duration***: Antibiotics are typically continued for one to two months after clinical improvement is observed, with the total duration of therapy ranging from four months to two years depending on the individual's response.
- ***Adjunctive Therapies***: In addition to antibiotics, warm compresses may help promote healing by reducing bacterial growth. Other therapeutic approaches include cryotherapy, electrodessication, and photodynamic therapy, which have shown efficacy in treating resistant lesions.
- ***Surgical Intervention***: Although rarely necessary, surgical debridement may be indicated in cases where the infection has progressed to involve deeper tissues, such as tendons, bones, or joints, or in cases of large or unresponsive lesions.

**Prognosis and Prevention**

The prognosis for fish tank granuloma is generally favorable, with most cases responding to appropriate antibiotic therapy. However, spontaneous resolution of the condition can occur over a prolonged period, sometimes up to two years. Without treatment, the infection may persist or spread to deeper tissues, particularly in immunocompromised individuals.

Preventive measures include the use of waterproof gloves when handling raw fish or cleaning fish tanks, thorough hand washing after exposure to standing water, and ensuring that open wounds or abrasions are not exposed to potentially contaminated water. Additionally, ensuring that swimming pools are adequately chlorinated can help reduce the risk of infection.

**Conclusion**

Fish tank granuloma is a rare, but increasingly recognized, infection caused by *Mycobacterium marinum*. It is most common in individuals who handle aquatic animals or contaminated water,

such as aquarium owners and pet shop workers. The infection typically presents as a slow-growing, painful nodule or plaque at the site of trauma, and while it is often self-limiting, appropriate antibiotic treatment is essential to prevent progression. Early diagnosis, based on a detailed patient history and microbiological testing, is key to successful management. With appropriate care, the prognosis is generally good, though prevention through careful handling of aquatic environments remains the most effective strategy.

## References


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